Chapter 12

12. Mission Pilot

OBJECTIVES:

1. State mission pilot duties and responsibilities. {P; 12.1}
2. Discuss safety matters related to CAP activities. {P; 12.2}
3. Concerning transportation flights: {P; 12.3.1}
   a. State where to find out if someone is authorized to fly in CAP aircraft.
   b. State the pilot requirements needed to transport the typical non-CAP person in CAP aircraft.
4. Discuss special precautions for flying CAP missions at night. {P; 12.3.2}
5. Discuss special precautions for flying CAP missions in IMC. {P; 12.3.3}
6. Discuss the special considerations for video imaging missions, and discuss the typical video imaging flight profile. {P; 12.3.4}
7. Discuss proficiency. {P; 12.3.5}
8. Discuss security and airspace restrictions. {P; 12.4.1 & 12.4.2}
9. Describe the three phases of an aircraft interception, your actions when intercepted, and discuss visual intercepting/intercepted signals. {P; 12.4.3}
10. Describe the types of items that should be kept in the aircraft glove box. {P; 12.5}
11. Discuss the importance of the Aircraft Flight Log and the Discrepancy Log. List the entries you should be able to locate in the aircraft logs. {P; 12.5.1}
12. Discuss startup checks, leaning the engine, and taxi. {P; 12.5.2}
13. Discuss climb and departure, and state crosswind limitations. {P; 12.5.3}
14. Discuss approach, descent and landing, and your after-landing actions. {P; 12.5.4 & 12.5.5}
15. Discuss those items you can control to improve POD. {P; 12.6}
16. State the normal, assumed number of aircrew needed for a mission. {P; 12.7}
17. Discuss how you must alter normal search patterns if you only have one scanner onboard. {P; 12.7.1}

18. Discuss special considerations for flying CAP search patterns. {P; 12.7.2}
19. Discuss "go/no go" decision-making. {P; 12.7.3}

12.1 Mission Pilot duties and responsibilities

The first and foremost duty of a mission pilot is to fly the aircraft in a safe and proficient manner, following all applicable FAA and CAP rules and regulations. All other duties are secondary to those of the aircraft commander.

The second most important duty of a mission pilot is to remember that he or she is the pilot -- not a scanner. You are the Pilot-in-Command (PIC) and you must never forget that.

The mission pilot is responsible for incorporating Operational Risk Management and Crew Resource Management principles and practices into each mission.

In addition to the normal duties of PIC, CAP mission pilots must also perform all the duties of the Observer if no qualified observer is on board (refer to 1.2).

The mission pilot is responsible for getting proper briefings and for planning the sortie. A good mission pilot always includes the observer during these activities. Remember, you may be the aircraft commander but you are not always the mission commander; an experienced observer should serve as mission commander whenever possible.

In addition to PIC duties, the mission pilot must:

- Thoroughly brief the crew before the flight.
- Thoroughly brief the crew on their responsibilities during all phases of the flight.
- Obtain a flight release.
- Enforce sterile cockpit rules.
- Fly search patterns as completely and precisely as possible. Report any deviations from the prescribed patterns during debriefing.
- Monitor the observer and ensure all events, sightings and reports are recorded and reported.
- Fill out all forms accurately, completely and legibly.

12.2 Safety

CAP flying involves several unique aspects and practices that may impact safety.

12.2.1 Flying Into and Taxiing on Unfamiliar Airports

CAP missions often require flying into small, non-towered and unlighted airports. The mission pilot needs to quickly obtain information about these airfields. Of particular importance:

- Runways. Determine length, width, markings and lighting. Is runway alignment compatible with predicted wind direction and strength? If not, what is your alternative?

- Taxiways. Are there any, or will you have to back taxi? Are the taxiways marked and/or lighted?

  If you will be arriving in low visibility conditions or at night, taxi SLOWLY and use a wing walker if necessary. If you can't see the turnoff to the taxiway or the taxiway itself -- STOP.
- Obstacles. Note all near the airport and its approaches.
- Services. Fuel and oil, phone, tie downs, and maintenance. Will they be open when you arrive? Is there a phone number to call after normal hours? If in doubt, call ahead -- most FBOs are glad to assist CAP.
- Local NOTAMS.

CAP missions also require flying into large, busy airports. Of particular importance:

- Airspace and obstacles. Review airspace layout and restrictions, and note all relevant frequencies (including ATIS, AWOS or ASOS).
- Taxiways. Make sure you have a taxiway diagram, and review it before you land. Brief the crew so they can assist you.
- Local NOTAMS.

CAP missions also require taxiing around and near a large number of aircraft:

- Follow the taxi plan that is in the Operations Plan, if applicable.
- Follow all signals given by flight line personnel. However, use common sense as some of the flight line marshals may have little or no experience. If it looks too close -- STOP.

Pilot aids such as the *Airport/Facility Directory* or commercial products such as the *Flight Guide* (Airguide Publications, Inc.) are invaluable tools for the CAP mission pilot. One should be carried in the aircraft at all times, and kept *current*. Also, several web sites (e.g., *AOPA*) have very detailed airport layouts available for downloading.

Another often-overlooked safety measure is reconnoitering the terrain around unfamiliar airports to determine your actions in the event the engine quits on takeoff. Get in the habit of flying a circuit around the airport upon arrival to look for emergency landing areas off the ends of each runway. Ask local pilots for the best actions to take if you lose an engine on takeoff (from each runway). Also, suggest that mission staff include this information in the general briefing, if necessary.

12.2.2 Squawks

CAP aircraft have Discrepancy Logs - use them! While private pilots may delay 'minor' repairs, mission pilots should not. Just as ELT missions always seem to occur between midnight and 0dark30, you can bet that a nighttime mission will come up if a landing, taxi, strobe or navigation light is out. Been having troubles with your comm radios? Get ready for an ELT search in Class B airspace.

CAP pilots often fly unfamiliar aircraft during missions. Pay particular attention to each aircraft's squawk sheet, and don't fly unless you are satisfied with the aircraft's condition: question the aircraft's regular crew about the particulars of their aircraft -- probe for "unwritten" squawks.

In a related matter, keeping the aircraft windows clean and having a well-stocked cleaning kit in the aircraft is vital. How many of you have arrived at the airport for a night flight and found that the last pilot had flown through a bug

convention and neglected to clean the windscreen? And, as if this isn't enough of a delay in launching the mission, you can't find anything to clean the windscreen!

12.2.3 Fuel management

CAP missions often require flying long distances to mission bases, and the missions themselves involve flying several sorties a day. Mission aircrews often carry a lot of luggage and equipment. Missions are flown in widely varying weather conditions. Therefore mission pilots must carefully plan, check and manage their fuel.

- Weight & Balance computations *must* be accurate. Do you include the weight of the permanent equipment stowed in the aircraft? Do you change your W&B from the standard FAA 170 pounds when a crewmember that doesn't meet the Air Force weight standards shows up? Do you have a scale available at your headquarters to weigh luggage and equipment?
- If you do not fill the aircraft fuel tanks to the top or a tab, do you have a means to accurately determine fuel on board? Each aircraft that is routinely filled to a level less than full should have a calibrated fuel-measuring device on board. Remember that these devices are specific to the particular aircraft!
- Pilots often fly unfamiliar aircraft during a mission. Take the time to learn the fuel and oil consumption figures for the aircraft.

  Each CAP aircraft should have information concerning the aircraft's fuel consumption rate for various power settings, taken from actual flight conditions. If the information is not in the aircraft, ask the aircraft's regular pilot for fuel burn rates. If neither of these options is available, be very conservative in your planning.
- Long cross-country flights, or a series of legs in a flight, or a series of mission sorties require careful planning. Make sure you note your assumptions (e.g., distance, power setting, and predicted wind direction and speed) so that you can compare them against actual conditions in flight.

  Brief your crew, especially the observer, on these assumptions so they can assist you in managing the fuel. The pilot or observer should ask about fuel status at least once an hour, or before departing on each leg or sortie. Are the winds as predicted, or are you facing a stronger-than-expected headwind? Is your power set at economy cruise, as you planned, or have you gone to full power because you're running late? Did the last leg take as long as you had planned, or did ATC put you in the north forty for 30 minutes for "traffic separation"?

How do you describe a pilot who stretches his fuel to save the 20-30 minutes it takes to land and refuel, or a pilot who lands and refuels just because she wasn't comfortable with her fuel situation? The first is an incompetent pilot who's willing to risk himself, his passengers and the aircraft for some perceived "macho" image of a daring pilot. The second is a CAP Mission SAR/DR Pilot.

- If in doubt, *land and refuel!* Just in case, *land and refuel!*

12.2.4 Unfamiliar Aircraft Equipment

CAP aircraft are not equipped uniformly. If you are assigned to another aircraft than the one you usually fly, check the equipment.

- If you don't know how to use its GPS, tell air operations. If you can't set up and operate the GPS, you won't be able to use it correctly. If you try to learn "on the fly," you will spend too much time with your head inside the aircraft instead of looking outside.
- The same reasoning applies to the Audio Panel, FM radio, and DF unit. In these cases, someone will probably be available to show you how to set up and operate the equipment.
- Even something as simple as an unfamiliar navaid can affect safety. In most cases, just spending some time sitting in the aircraft and going over an unfamiliar comm radio or transponder will suffice. But if you've never used an HSI before, this isn't the time to learn.
- *Whatever you do, don't try to bluff your way through*. Tell someone and ask for assistance. Another pilot can help you, or mission staff may assign another pilot or experienced observer to your crew who knows how to operate the equipment.

12.2.5 Unfamiliar terrain and weather

CAP missions often require you to fly to a different part of the state, or to a different state altogether. While you will be flying the same type of search patterns and using many of the same techniques, the terrain may differ considerably from you local terrain. Different terrain often is accompanied by different weather patterns and conditions.

Mission staff will brief you on local conditions, and may even give you training specific to their area. But you need to arrive as prepared as possible. In particular, you need to ensure you have the proper clothing, equipment, and survival gear for both the terrain you are crossing and the terrain in which you will be operating. What is required for one area can differ considerably from what you need in another clime.

12.2.6 Trainees and inexperienced crewmembers

CAP aircrew members may be trainees, or simply inexperienced. You must take the time to ascertain the qualifications and experience level of any crewmember assigned to you.

- If a crewmember is a trainee, spend extra time on briefings and be very specific as to duties and responsibilities. If the trainee is a scanner, listen in on the observer's briefing to make sure he does the same. Make sure trainees understand that, while you will teach them as much and as often as possible, you (and the observer) have duties that must not be interfered with.
- If a crewmember is newly qualified or has not flown in some time, make allowances. You may have to assume some of their normal duties (e.g., setting up and operating navaids or radios) in certain situations, so be sure to brief them so there is no confusion. For example, you may brief that you will handle all ATC communications while in Class C airspace while the inexperienced observer will handle all other communications.

- Cadets and some seniors often qualify as flight line marshallers as their first mission specialty, and there is no practical way to determine their experience level. On some missions the flight line is handled by whoever is available, regardless of qualifications. Be alert and brief your aircrew to be alert. Don't hesitate to stop the aircraft if a marshaller's signals don't make sense or seem to be leading you into an unsafe situation.

12.2.7 Low and slow

CAP mission search patterns often require you to fly below 1000 AGL and at speeds at or below 90 knots. Proficiency and planning are critical.

- Ensure that "low and slow" is an integral part of your proficiency program.
- Strictly enforce sterile cockpit rules under these conditions, and make sure your crew is briefed on all obstacles in the search area.
- Flying at low altitude often means losing radar and communications with ATC and mission base. Don't hesitate to climb back up to an altitude where you can make your "ops normal" reports.
- Maintain situational awareness and continually ask yourself, "If the engine quits now, where will I land?"

12.3 Types of Flights

CAPR 60-1 covers the types of flights for CAP aircraft. We want to look at a few of these in a little more detail.

12.3.1 Transportation Flights

Always consult CAPR 60-1, 2-6, when you need to know who is authorized to fly as passengers in CAP aircraft and the conditions under which they are authorized to fly.

12.3.2 Night Flights

Typical sorties flown at night are transport sorties, route searches, and DF searches (it seems these are always flown at late at night).

As a minimum, the PIC should be night-current in the aircraft (category, class and type) you're going to fly and assure the 45-minute fuel reserve required by the CFR. When performing night searches it is preferable to have an experienced crew accompanying the pilot to assist in situational awareness and search procedures.

Night time route searches will only be successful if the downed aircraft or missing person has the capability to signal the aircraft or if an ELT has been activated. Usually, ground team searches near the LKP or intended airport stand a better chance of success. No CAP crewmember may use night vision devices during any flight operations.

The most important item when planning night sorties is the PIC. Flying at night requires more attention to preflight planning and preparation. In particular, a careful check of the weather is essential; probably the most significant problem that can occur at night is flying into weather you cannot see. Also, pay attention

to the dew point spread as a predictor of fog. During the flight, maintain situational awareness and always know where you can land in an emergency.

Before you accept the mission, ask yourself a few questions:

- If all the night flying you have had in the last 90 days are your three takeoffs and landings, are you really proficient?
- How long has it been since you've done a night cross-country?
- How long has it been since you've done a night ELT search?
- If you are Instrument rated, how many approaches have you done at night lately?
- How familiar are you with the terrain and obstacles along the route?
- Since landing lights only fail at night, when was the last time you practiced landing without the landing light?
- Have you included all your flashlights in the weight-and-balance?

Remember that confidence is gained by experience, so you should include night flying in your proficiency regimen. You should also include periodic DF training at night (see 12.2.5).

Nighttime Illusions

Many different illusions can be experienced in flight; some can lead to spatial disorientation while others can lead to landing errors. Illusions rank among the most common factors cited as contributing to fatal airplane accidents (e.g., JFK, Jr.). Various complex motions and forces and certain visual scenes encountered in flight can create illusions of motion and position. Spatial disorientation from these illusions can be prevented only by visual reference to reliable, fixed points on the ground or to flight instruments.

When you enter a bank too slowly to stimulate the motion-sensing system of the middle ear and then apply a correction to the bank, this can create the illusion of banking in the opposite direction. The disoriented pilot will roll the airplane back to its original dangerous attitude or, if level flight is maintained, will feel compelled to lean in the perceived vertical plane until this illusion subsides. This phenomenon is usually referred to as the “leans” and the following illusions fall under this category:

- *Coriolis Illusion*. When you are in a prolonged constant-rate turn that has ceased stimulating the motion-sensing system and you make an abrupt head movement, this can create the illusion of rotation or movement on an entirely different axis. The disoriented pilot will maneuver the airplane into a dangerous attitude in an attempt to stop this illusion of rotation. This most overwhelming of all illusions may be prevented by not making sudden, extreme head movements, particularly while making prolonged constant-rate turns under IFR conditions (e.g., dropping you pen and quickly reaching down for it).
- *Graveyard spin*. A proper recovery from a spin that has ceased stimulating the motion-sensing system can create the illusion of spinning in the opposite direction. The disoriented pilot will return the airplane to its original spin.
- *Graveyard spiral*. An observed loss of altitude during a coordinated constant-rate turn that has ceased stimulating the motion-sensing system can create the illusion of being in a descent with the wings level. In this case, the disoriented pilot will pull back on the controls, tightening the spiral and increasing the normal load factor on the airplane.

- *Inversion Illusion*. An abrupt change from climb to straight-and-level flight can create the illusion of tumbling backwards. The disoriented pilot will push the airplane abruptly into a nose low attitude, possibly intensifying this illusion.
- *Elevator Illusion*. An abrupt upward vertical acceleration, usually caused by an updraft, can create the illusion of being in a climb. The disoriented pilot will push the airplane into a nose low attitude. [An abrupt downward vertical acceleration (downdraft) has the opposite effect.]
- *False Horizon*. Sloping cloud formations, an obscured horizon, a dark scene spread with ground lights and stars, and certain geometric patterns of ground light can create illusions of not being aligned correctly with the horizon. The disoriented pilot will place the airplane in a dangerous attitude.
- *Autokinesis*. In the dark, a static light will appear to move about when stared at for many seconds. The disoriented pilot will lose control of the airplane in attempting to align it with the light. [At night, a bright light with no other lights around it is particularly disorienting.]

Various surface features and atmospheric conditions encountered during landing can create illusions of incorrect height above and distance away from the runway threshold. Landing errors from these illusions can be prevented by: anticipating them during approaches; aerial visual inspection of unfamiliar airports before landing (e.g., use a 'standard' pattern entry); using an electronic glide slope or visual approach slope indicator (VASI) system when available; and maintaining optimum proficiency in landing procedures. The following illusions apply to this category:

- *Runway Width Illusion*. A narrower than usual runway can create the illusion that the airplane is at a higher altitude than it actually is. The pilot who does not recognize this illusion will tend to fly a lower approach, with the risk of striking objects along the approach path, or land short. [A wider than normal runway can have the opposite effect, with the risk of flaring high and landing hard or overshooting the runway.]
- *Runway and Terrain Slopes Illusion*. An up-sloping runway, up-sloping terrain, or both, can create the illusion that the airplane is at a higher altitude than it actually is. The pilot who does not recognize this illusion will fly a lower approach. A down-slope can cause the opposite effect.
- *Featureless Terrain Illusion*. An absence of ground features, as when landing over water, darkened areas and terrain made featureless by snow, can create the illusion that the airplane is at a higher altitude than it actually is. The pilot who does not recognize this illusion will tend to fly a lower approach. [The best remedy is to fly a 'standard' approach to landing.]
- *Atmospheric Illusion*. Rain on the windshield can create an illusion of greater height, and a greater distance from the runway. The pilot who does not recognize this illusion will tend to fly a lower approach. Penetration of fog can create the illusion of pitching up. The pilot who does not recognize this illusion will steepen the approach, often quite abruptly.
- *Ground Lighting Illusions*. Lights along a straight path, such as a road, and even lights on trains can be mistaken for runway and approach lights. Bright runway and approach lighting systems, especially where few lights

illuminate the surrounding terrain, may create the illusion of less distance to the runway. The pilot who does not recognize this illusion will tend to fly a higher approach. Conversely, the pilot flying over terrain which has few lights to provide height cues may make a lower than normal approach.

12.3.3 IFR Flights

CAP sorties are very seldom flown in IMC. The most common reason for an IFR flight is to transport personnel to a search area or mission base.

However, it is possible to conduct a route search in IMC. If an aircraft was lost while on an IFR flight plan, a sortie may be launched along the same route with the hope of picking up an ELT signal. This approach may also be taken, with careful planning and close coordination with ATC, for aircraft lost outside prescribed IFR routes.

It is also possible to DF in IMC, but this can be dangerous and is not to be undertaken lightly.

In any case, a few extra precautions are in order:

- The pilot must have completed section XIV, "Instrument Proficiency" on her Form 5.
- The PIC must meet FAA instrument flight proficiency requirements.
- The PIC should be proficient in instrument flight in the CAP aircraft to be used.
- For any flight other than a simple IFR transportation flight, it is highly recommended that another current and proficient Instrument-rated pilot be in the right seat. *Never* fly a search alone in IMC.
- Never fly an instrument search when ground teams are appropriate and available for the search.

12.3.4 Video Imaging

More and more, we are performing aerial reconnaissance for our partner agencies. We primarily take still photos (digital and 35mm) and video (analog and digital), and may use Slow Scan video. The mission pilot must know how to fly these missions. As SAR missions decline and the phase-out of 121.5 MHz ELTs begins, video imaging will become one of CAP's most valuable assets.

Emergency response planners expect more timely information about developing situations. These planners recognize real-time and near real-time images as an invaluable tool.

Regardless of the type of video imaging mission, there are some basics that everyone involved in the mission need to know to ensure success. The following presents the extra essentials needed for a video mission briefing:

- Make sure each crewmember knows what the target is and what types of images are needed. For example, a sortie may require a digital still shot of the target area for orientation, followed by a recorded video to detail egress points.
- Ensure the target location is identified so that you can find it.
- Thoroughly brief the route to and from the target, and the flight patterns within the target area. Mark them on the appropriate sectional chart and maps (e.g., road or topographical).

- Ensure minimum altitudes are established, both for the routes to and from the target and in the target area.
- Ensure all communications frequencies are well understood. This is particularly important for Slow Scan sorties.
- Define the duties of the PIC and the photographer when in the target area. The photographer will actually be in command of the mission and will give directions to the pilot, but the PIC retains responsibility for the safe operation of the aircraft.
- Ensure video equipment batteries are fully charged and that extra batteries are available.
- Clean the aircraft windows. If the video will be shot from the front right seat (normal), remove the window latch screw and put it in a safe place.
- For Slow Scan sorties, make sure the equipment is secured and properly connected. Make a test transmission before you leave the ramp.

The customer sometimes defines video imaging flight profiles, but a typical profile is shown (Figure 12-1) and discussed below.

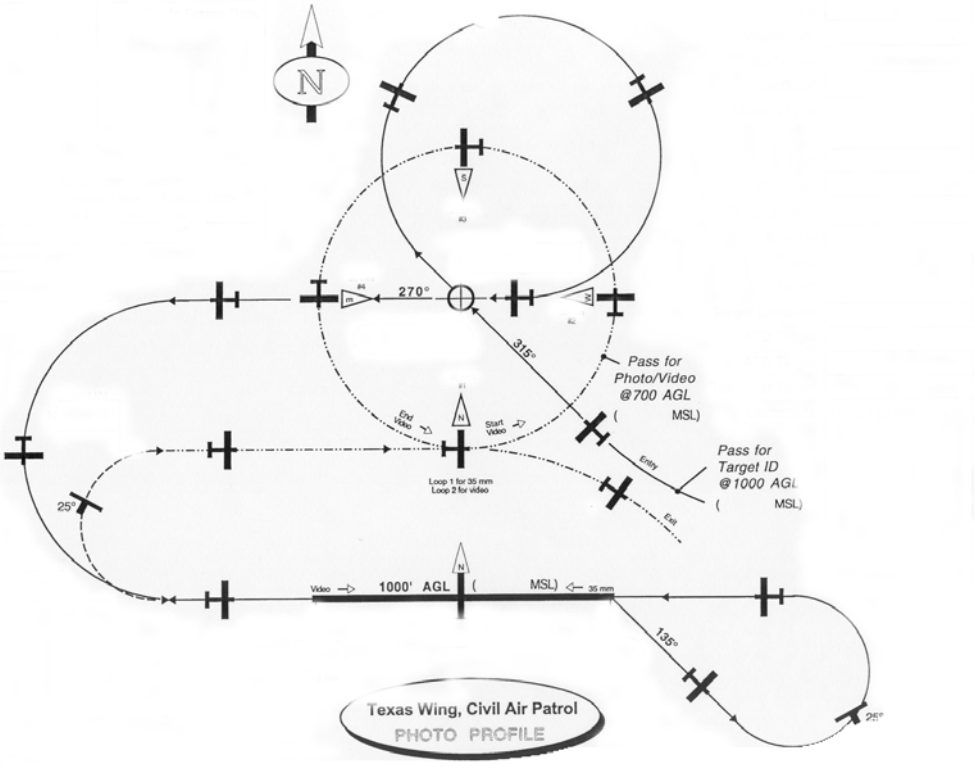

Figure 12-1

As the aircraft approaches the target the photographer should alert the pilot and prepare to begin photographing the target. You may need to over-fly the target first for positive identification. Assume the photographer is in the right front seat.

The first step is to take an identification photo, usually one mile south of the target from an altitude of 1000' AGL. The photographer will begin shooting as soon as the aircraft is established on this easterly route. If another pass is needed, the pilot will circle around to repeat the route.

Next the pilot will turn toward the target, descend to 500' AGL and establish a 1/2 nm circuit around the target. The photographer will be taking shots at the cardinal points of the circle, or continuously if using video. This circuit may be enlarged to fit the target area or if it is important to identify entrance and egress routes near the disaster area.

During slow-scan sorties it may be necessary to climb to a higher altitude to transmit each image.

NOTE: Never hesitate to make another pass or move to a better position if necessary to ensure the success of the sortie. Film (especially digital) is cheap and flight time is expensive; it is better to make another pass or reposition the aircraft at the scene than it is to send another aircraft back to repeat the mission.

12.3.5 Proficiency Flights

CAPR 60-1 encourages pilots to maintain currency and proficiency by accomplishing a self-conducted proficiency flight at least once every 90 days (described in an Attachment, and using mission symbol C1). More specifically, mission pilots are authorized four hours of proficiency flight training per calendar month under Air Force-assigned non-reimbursed mission status (described in an Attachment, and using mission symbol B12).

As the demands on the CAP mission pilot increase, the need to maintain and improve your mission skills becomes more important. Besides the guidance given in the CAPR 60-1 Attachments, you should also practice:

- Search patterns. Use the GPS as your primary tool but also practice planning and flying the different patterns using VORs and pilotage.
- Night proficiency. Practice search patterns at night (particularly the ELT search).

As part of your cross-country proficiency, practice with the GPS:

- Maintain a constant track over ground.
- Select/display a destination: Airport, VOR and User Waypoint.
- Determine heading, time and distance to a waypoint.
- Save lat/long coordinates as a User Waypoint.
- Save your present position as a user waypoint.
- Enter and use flight plans.
- Exercise the nearest airport and nearest VOR features.
- Practice navigating with present position displayed (constant lat/long display).

Always try to take someone along with you on your proficiency flights. This will provide excellent practice for scanners and observers, helps improve CRM and teamwork, and makes the flights more enjoyable. [Remember, if you are going to be practicing instrument approaches you must use a safety pilot. It is also preferred to have one during your night practice, although a qualified non-pilot observer will serve just as well.]

12.4 Security Concerns and Airspace Restrictions

The September 11th terrorist attack brought about heightened security concerns and the potential for airspace restrictions.

12.4.1 Security

CAP resources should be considered National Security assets. In times of emergency you should take special security precautions to protect the aircraft and crew. Some examples are:

- Hanger the aircraft whenever possible. You may place small pieces of clear tape on fuel caps, the cowling and/or doors that will break if someone tampers with vital areas.
- Pay particular attention during pre-flight inspections. Look for signs of tampering and carefully inspect the fuel for contamination.
- Be as "low key" as possible, and be discrete. Don't discuss CAP business in public places.
- Be aware of your surroundings at all times. If you see something or someone that is suspicious, don't ignore it. Report your suspicions to your supervisor and/or law enforcement.

12.4.2 Airspace Restrictions

The FAA may issue Temporary Flight Restrictions at any time, so it is vitally important to check for FDC NOTAMs before each flight and to monitor ATC for changes while in flight. TFRs were issued to establish enhanced Class B airspace, protect airspace around nuclear facilities, and protect airspace around large gatherings of people.

Even with TSRs lifted, you should not loiter around or circle critical facilities (e.g., nuclear power plants, large stadiums or gatherings, air shows, and dams or reservoirs). If you have to circle critical facilities (e.g., for planning or actual mission purposes) make sure you coordinate with the facility's manager and ATC.

12.4.3 In-flight Intercept

If your aircraft accidentally approaches or encroaches restricted airspace military aircraft may intercept you; it is important to know how to respond. The following covers the important points; details can be found in AIM 5-6-2.

An intercept to identify your aircraft has three phases:

- Approach phase. A flight leader and wingman will coordinate their individual positions in conjunction with the ground-controlling agency.
- Identification phase. The intercepted aircraft should expect to visually acquire the lead interceptor and possibly the wingman during this phase. The wingman will assume a surveillance position while the flight leader approaches your aircraft. The flight leader will then initiate a gentle closure toward the your aircraft, stopping at a distance no closer than absolutely necessary to obtain the information needed. The interceptor aircraft will use every possible precaution to avoid startling you.

- Post-intercept phase. After you have been identified, the flight leader will turn away. The wingman will remain well clear and rejoin the leader.

If you are intercepted you should immediately:

- Follow the instructions given by the intercepting aircraft, interpreting and responding to the visual signals (see Table 12-1 below).
- Notify ATC if possible.
- Attempt to communicate with the intercepting aircraft and/or ATC on the emergency frequency 121.5 MHz, giving the identity and position of your aircraft and the nature of the flight.
- If equipped with a transponder, squawk 7700 unless otherwise instructed by ATC. If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by visual or radio signals, request clarification while continuing to comply with the instructions given by the intercepting aircraft.

Table 12-1

Intercepting aircraft signal	Meaning	Intercepted aircraft response	Meaning
Rocks wings. After acknowledgement initiates a slow level turn, normally to the left, onto desired heading.	You have been intercepted. Follow me.	Rocks wings and follows.	I understand and will comply.
(At night, the pilot will also flash the navigational lights at irregular intervals.)		*(At night, the pilot will also flash the navigational lights at irregular intervals.)*	
Performs an abrupt breakaway maneuver consisting of a climbing 90º turn without crossing the intercepted aircraft's flight path.	You may proceed.	Rocks wings.	I understand and will comply.
Circles airport, lowers landing gear, and over-flies runway in the direction of landing.	Land at this airport.	Lowers landing gear, follows the intercepting aircraft and lands if the runway is considered safe.	I understand and will comply.
(At night, the pilot will also put the landing lights on.)		*(At night, the pilot will also put the landing lights on.)*	

Raises landing gear while flying over runway between 1,000' and 2,000', and continues to circle the airport.	This airport is inadequate.	If the intercepted aircraft is requested to go to an alternate airport, the intercepting aircraft raises its landing gear and uses the intercept procedures (listed above).	Understood, follow me.
(At night, the pilot of the intercepted aircraft will also flash landing lights while passing over the runway.)		To release the intercepted aircraft, the intercepting aircraft will perform the breakaway maneuver listed above.	Understood, you may proceed.
The pilot switches on and off all available lights at regular intervals.	Cannot comply.	Performs the breakaway maneuver listed above.	Understood.
The pilot switches on and off all available lights at irregular intervals.	In distress.	Performs the breakaway maneuver listed above.	Understood.

12.5 Phases of Flight

We will now look at the various phases of flight strictly from a mission pilot's point of view (the phases are covered in general in the following chapter). In all cases, follow the aircraft checklist: the observer should read each item to you, and then you will perform the item and repeat back performance of the item.

Before we start, lets look at one of the most overlooked assets you have in the aircraft -- the glove box. This area is ideal for items such as small, laminated sheets for the crew and passenger briefing, crosswind chart, public relations cards (like those from the CD program), FM radio frequencies and callsigns, ELT deactivation stickers, and a GPS cheat-sheet. Other items could include a small cleaning rag (like for glasses) to clean the GPS display and a backup flashlight. Check the glove box periodically and purge unnecessary stuff.

12.5.1 Prior to startup

After you have obtained the flight release, fill in all required information on the aircraft flight log. Ensure proper entries for mission symbol, mission number, crew names, and FRO name. Double-check the starting Tach and Hobbs times. Make sure you won't exceed oil change (every 40-60 Tach hours) or 100-hour/Annual times.

Brief the crew on your fuel management plan and assumptions, and assign responsibility for inquiring about fuel status once an hour.

Check the Discrepancy log! Make sure you understand every entry, and make sure none of the discrepancies make the aircraft unsafe for flight.

Aircraft paperwork

Knowledge of aircraft paperwork directly pertains to airworthiness and safety.

It is important for the mission pilot to understand how to find data in aircraft logbooks. Familiarize yourself with your aircraft's engine, propeller, airframe, and avionics logbooks so that you can identify items such as the time of the last oil change, last 100-hour inspection or annual, and instrument requirements (i.e., ELT battery, pitot-static system, transponder and altimeter current).

Also, check other items such as the expiration dates on the carbon monoxide detector and fire extinguisher, and the date of the last VOR check (the VOR check is not required for VFR flight but it must be successfully completed within 30 days of any IFR flight). Also, fill out the applicable portions of the aircraft flight log.

12.5.2 Startup and taxi

Aircraft Checklists

Always use the checklists in CAP aircraft. Whenever possible, have the right-seat crewmember read the checklist items to you while you check the items and repeat back accomplishment of each item.

Make sure you or the right-seat crewmember keeps the checklist close at hand so that it can quickly be opened to confirm and complete emergency items. Brief the right-seat crewmember on how to use the emergency checklists (e.g., read the bold face items first and then continue with the rest of the items).

All crewmembers must wear their seat belts at all times. Although CAPR 60-1 only requires that the shoulder harnesses be worn at or below 1000' AGL, all crewmembers should wear their shoulder harness at all times unless other duties require their removal (e.g., observer taking photos).

Startup

Be sure and include the DF unit's Alarm light self-test in your scan during startup. The light should blink for several seconds; if it doesn't your unit may be inoperative. Also ensure that the CAP FM radio is set up properly (both on the radio and the audio panel).

For the typical Cessna, lean the engine immediately after starting when density altitude is >3000’ (lean to rough and then richen two or three turns). Similarly, lean the engine for maximum power before takeoff (run the engine up to full power, lean to peak EGT, and then richen two full turns).

Taxi

Collision avoidance! Collision avoidance! Collision avoidance! Remember to read back all clearances and hold-short instructions.

An increasing number of taxi mishaps are the number one trend in CAP. Investigations reveal that pilots are: straying from designated taxi routes, not allowing adequate clearance, not considering the tail and wings during turns, taxiing too fast for conditions, taxiing with obscured visibility, distracted by cockpit duties, and not using other crewmembers to ensure clearance.

Review the crew assignments for taxi, takeoff and departure. Make sure each crewmember knows in which direction they should be looking. *Sterile cockpit rules are now in effect - the crew will limit conversation to mission- and safety-related topics*.

12.5.3 Takeoff, climb and departure

Takeoff

Ensure you are within crosswind limits of the aircraft's POH (or the CAP limit of 15 knots):

CROSSWIND CHART

WIND SPEED (Kts)	DEGREES OFF RUNWAY HEADING								
	10	20	30	40	50	60	70	80	90
8	1	3	4	5	6	7	8	8	8
9	2	3	4	6	7	8	8	9	9
10	2	3	5	6	8	9	9	10	10
11	2	4	5	7	8	10	10	11	11
12	2	4	6	8	9	10	11	12	12
13	2	4	6	8	10	11	12	13	13
14	2	5	7	9	11	12	13	14	14
15	3	5	7	10	11	13	14	15	15
16	3	5	8	10	12	14	15		
17	3	6	8	11	13	15			
18	3	6	9	12	14				
19	3	6	9	12	15				
20	3	7	10	13	15				
21	4	7	10	13					
22	4	8	11	14					
23	4	8	11	15					
24	4	8	12	15					
25	4	9	12						
26	5	9	13						

Climb

The most common engine leaning technique, especially for aircraft without an EGT gauge, is to lean until the engine just starts to run roughly, then richen until it is smooth again, then further richen 1 1/2 turns on the large knob. This is a good technique because it can be accomplished by hearing and feel, leaving the eyes free to look outside.

If an EGT gauge is available: For max continuous power, lean to peak EGT then richen 100 degrees rich-of-peak; for a reduced power (economy) setting, lean to peak EGT then richen 50 degrees rich-of-peak.

But guess what? The common technique (hearing and feel) will give almost the same setting as the EGT gauge. Try it sometime and compare the results.

Remember, in all cases the objective is to burn gas, not valves. Gas is cheaper than engine overhauls. Please take good care of our engines -- they keep us in the air.

Departure

Collision avoidance! Collision avoidance! Collision avoidance! Maintain sterile cockpit until well clear of traffic and obstacles. When above 1000' AGL the crewmembers can remove their shoulder harnesses, but it is best to leave them fastened unless it interferes with a task (e.g., video sortie).

Take this time to organize the cockpit, review assignments, and set up for the search pattern. You should be stabilized on the correct heading, speed and altitude at least three miles prior to entering the search area, if possible.

12.5.4 Approach, descent and landing

Approach

Review the crew assignments for approach, landing and taxi. Make sure each crewmember knows in which direction they should be looking. *Sterile cockpit rules are now in effect*.

Collision avoidance! Collision avoidance! Collision avoidance!

Now is the time to obtain ATIS (or AWOS) and contact approach control. Also review the airport taxi diagram.

Descent

Probably the most common error with leaning is forgetting to richen the fuel mixture during descents. There is a descent checklist, remember? And “Mixture Rich” is on the checklist. One more item during descent: don't shock-cool the engine! A well planned, partial power, mixture rich, cowl flaps closed descent is best.

Landing

Apply grease and leave the runway with dignity.

Read back all clearances and hold-short instructions.

12.5.5 After landing

Fill in all remaining information on the aircraft flight log. Double-check entries for mission symbol, mission number, crew names, and FRO name.

Enter any new problems into the Discrepancy log. If an item needs to be entered, make a clear and complete entry. Record any information pertinent to the discrepancy that would help a technician to duplicate the problem (this aids in troubleshooting); feel free to speculate on the cause. If it is *clearly* a danger to further flight, call the aircraft custodian and have the aircraft grounded.

12.6 The Mission Pilot and POD

We discussed in Chapter 9 how the mission staff estimates the Probability of Detection (POD). Lets look at some factors affecting POD that you can control:

- Ask questions during briefings to ensure you *really* understand your assignment.
- Take the time to plan the flight thoroughly and make sure you are prepared to fly it before leaving mission base. This knowledge enables you to concentrate on the mission and "stay ahead of the aircraft," thus increasing search effectiveness.

- Maintain optimum altitude and airspeed. If you have to decrease power on a southbound leg and increase power when you turn northbound in order to maintain a constant 90 knots, then do it.
- Accuracy of navigation: Use the GPS! However, you should be ready to complete the search using other navigational methods should the GPS fail.
- Avoid turbulence whenever possible, avoid steep or abrupt turns, and ensure the mission commander is scheduling breaks and monitoring the scanners (and yourself) for fatigue or dehydration.
- Give a thorough debriefing and be brutally honest about your effectiveness.
- Stay proficient in your flying skills. Flying the aircraft and operating its equipment should be second nature, leaving you free to concentrate on accomplishing mission objectives safely.

12.7 Flying the Mission

Before missions are launched, the briefing officer provides you with information designating the routes to and from the search area, and the types of search patterns to be used upon entering the search area. Your planning should involve the observer, as they are familiar with each type of search pattern and can assist you in planning and navigation. While the observer should be scanning while you fly the pattern, they can assist you if things become confused (hey, it can happen).

The mechanics of planning and executing search patterns are covered in Chapters 10 and 11.

12.7.1 Number of Scanners on board

Search planning, probability of detection, and search pattern effectiveness depends upon some underlying assumptions; the most important as far as the aircrew is concerned is the *assumption that there is one crewmember dedicated to scanning out the right side of the aircraft and another on the left side*.

Since the majority of CAP aircraft are Cessna 172s that only carry three crewmembers, we will assume that the crew consists of a pilot, an observer in the right front seat, and a single scanner in the rear seat. We assume that the observer will be scanning out the right side of the aircraft while the scanner covers the left side. If a larger aircraft is used there may be two scanners in the rear seat; this will allow the observer to spend more time assisting you without seriously decreasing search effectiveness.

Mission pilots must remember that they are *not* scanners. A mission pilot who tries to fly the aircraft and scan the search area at the same time is doing neither job effectively or safely. The mission pilot is responsible for placing the scanners' eyes over the search area so they can do their job; your job is to fly the pattern precisely and effectively and for ensuring the safety of the aircraft.

Single Scanner

Planning and executing a search pattern with only one scanner on board is different from one where you have two scanners. You will only be able to search out one side (usually the right side) of the aircraft; this means that you must keep

the right side of the aircraft towards the search area at all times. This can have a significant effect on search time and aircraft hours. For example, this would require careful planning and flying on a grid search since you will have to modify your leg entries/tracks to ensure the scanner scans the entire gird (no inverted flight, please).

Additionally, this cannot help but decrease search effectiveness due to fact that you lose the "double coverage" or overlap you get with two scanners looking out opposite sides of the aircraft. Scanner fatigue also becomes more of a factor, and search times need to be reduced to account for this.

For these reasons, performing parallel track or creeping line searches with a single scanner is not recommended. Likewise, searching any but open/flat terrain with a single scanner significantly reduces your chances of success.

12.7.2 Flying a search pattern

The mission pilot's contribution to a successful search is his ability to fly the search pattern precisely while maintaining altitude and airspeed. This must be done while performing the duties of a Pilot-in-Command; in the search area the most important of these duties is to "see and avoid" obstacles and other aircraft.

Another special consideration in flying search patterns is the possibility of engine trouble or failure at low altitude. The mission pilot must always be aware of where she is, the wind direction, the nature of the terrain, and where she will land if the engine fails *now*. This also underscores the importance of a thorough pre-flight inspection.

Like the rest of the aircrew, the mission pilot must continuously and honestly critique her performance during the sortie. If you're not set up properly when you enter the search area, exit and start again. If you are off by half a mile on a leg, fly the leg again. If winds and/or turbulence caused you to fly the legs erratically, emphasize this during the debriefing.

12.7.3 To Go or Not to Go

The Incident Commander has authorized your flight, you have obtained a proper briefing and flight release, you have filed your flight plan, you have completed a thorough pre-flight of the aircraft, and your crew is briefed and ready to go. *A Mission Pilot may accomplish all of this and still not be safe to fly the mission*.

How can this be? All of the regulations and safety precautions have been followed to the letter. You have been extensively trained and have demonstrated proficiency by successfully completing a Form 91 checkride. Your wing commander has appointed you as a CAP Mission Pilot!

It all comes down to the individual pilot and the circumstances. How long has it been since you've taken off in a 14-knot crosswind? Have you ever taken off or landed on an icy runway? When is the last time you've flown cross-country at night? You're signed off for instrument privileges on your Form 5, but how long has it been since you've flown in actual IMC?

Pilots, by their nature, are confident in their abilities. Sometimes over-confident. Mix in overconfidence, unusual circumstances, and the need to put all those hours of training to the test. Now add the desire to help others who are in immediate danger and you have all the ingredients for a dangerous situation.

The most effective way to break this potential accident chain is for Mission Pilots to be brutally honest about their abilities under the present conditions. Mission Pilots (as Pilot-in-Command) must have enough courage and integrity to decline a mission that they don't feel *comfortable* doing.

- You're transporting a K-9 team to another airport. You are instrument qualified and current. Weather at the destination airport is above the published minimums. However, the ceiling and visibility at the destination airport are below your *personal* minimums. Do you go or not?
- You've been assigned a nighttime route search for an overdue aircraft. It's been 91 days since you've done three takeoffs and landings to a full stop at night. Do you go or not?
- You've been assigned a C206 for the flight. On paper, you are qualified to fly this aircraft on CAP missions. However, it's been a long time since you've actually flown a C206. There are other C206 qualified MPs at mission base. Do you go or not?
- You've been assigned a nighttime ELT search. Your crew consists of a newly qualified, non-pilot Mission Scanner. The DF is inoperable, so you will be using the wing null procedure to locate the ELT. PIREP'S are reporting moderate turbulence in the search area, and clouds are reported as 3000 overcast. The last time you practiced the wing null procedure was during your Form 91 checkride thirteen months ago. Do you go or not?
- You are the only qualified Mission Pilot available for an ELT search. You have an experienced crew and the aircraft and instruments are in perfect condition. The weather is CAVU. However, you have just started taking a prescription allergy medicine (no one, not even your FAA physician, knows this). Do you go or not?
- A large mission is underway to search for a missing aircraft. The search area is heavily forested with no landmarks. You have been assigned to fly a quarter-grid. There will be aircraft in each of the quarter-grids surrounding yours. It's been over five months since you have practiced flying with the GPS. Do you go or not?
- A mission is underway and you have every reason to believe the victims are alive. You are tracking the ELT signal when you begin to observe the overcast becoming lower and lower. Do you continue? If so, how will you set your "its time to execute a 180° turn" minimums?

These are just a few examples of the decisions that CAP Mission Pilots may face. In each of these examples there is a high likelihood that nothing (e.g., CAP regulations, mission procedures, or FRO procedures) would stop you from going.

It is up to you to decline a mission that you don't feel comfortable with. Civil Air Patrol depends on your integrity as a qualified Mission Pilot. You are responsible for the safety of yourself, your crew, and a valuable aircraft. It will not help the people in distress if you have an accident while searching for them.

So, just as it is important for SAR/DR crewmembers to be honest about what they see and don't see during a mission, it is vitally important that the Mission Pilot be very honest about their capabilities in a given situation. *No one, especially the crewmembers who depend upon you for their safety, will think less of you if you decline a particular mission for valid reasons*.